

What is claimed is:

1. A method of gasifying large molecular weight organic materials comprising the steps of:

supplying initial fuel gas and oxygen into a gasification reactor to produce  
5 water and carbon dioxide;

supplying the organic materials into the reactor and reacting them with the water and carbon dioxide to produce carbon monoxide and hydrogen gas;

discharging the carbon monoxide and hydrogen gas from the reactor;

recycling a part of the carbon monoxide and hydrogen gas discharged from the  
10 reactor into the reactor; and

reacting the carbon monoxide and hydrogen gas supplied into the reactor with oxygen to produce water and carbon dioxide.

2. The method according to claim 1, further comprising the step of reacting the  
15 water and carbon dioxide, that is produced from the recycled carbon monoxide and hydrogen gas, with the organic materials to produce further carbon monoxide and hydrogen gas.

3. The method according to claim 1, wherein the oxygen is supplied into the  
20 gasification reactor as the least amount as is required to maintain the temperature at about 1,300 °C in the reactor, and the carbon monoxide and hydrogen gas is supplied into the gasification reactor as the amount as is required to consume the oxygen completely in the reactor.

4. The method according to claim 2, wherein the oxygen is supplied into the gasification reactor as the least amount as is required to maintain the temperature at about 1,300 °C in the reactor, and the carbon monoxide and hydrogen gas is supplied  
5 into the gasification reactor as the amount as is required to consume the oxygen completely in the reactor.

5. The method according to claim 1, wherein the oxygen is supplied into the gasification reactor through at least two nozzles arranged on the wall of the reactor at a  
10 tangential direction.

6. The method according to claim 2, wherein the oxygen is supplied into the gasification reactor through at least two nozzles arranged on the wall of the reactor at a tangential direction.  
15

7. The method according to claim 1, wherein the part of the carbon monoxide and hydrogen gas is supplied into the gasification reactor through at least two nozzles arranged on the wall of the reactor at a tangential direction.

8. The method according to claim 2, wherein the part of the carbon monoxide and hydrogen gas is supplied into the gasification reactor through at least two nozzles arranged on the wall of the reactor at a tangential direction.  
20

9. The method according to claim 1, wherein the organic materials are coal.

10. The method according to claim 1, wherein the organic materials are waste oil.

5

11. The method according to claim 1, wherein the organic materials are shredded waste tire.

12. A method of gasifying large molecular weight organic materials comprising  
10 the steps of:

heating a gasification reactor to a temperature sufficient to gasify the organic materials;

supplying initial fuel gas and oxygen into the reactor to produce water and carbon dioxide with heat;

15 supplying the organic materials into the reactor and reacting them with the water and carbon dioxide to produce carbon monoxide and hydrogen gas;

discharging the carbon monoxide and hydrogen gas from the reactor;

recycling a part of the carbon monoxide and hydrogen gas discharged from the reactor into the reactor;

20 reacting the carbon monoxide and hydrogen gas supplied into the reactor with oxygen to produce water and carbon dioxide with heat; and

reacting the water and carbon dioxide with the organic materials to produce carbon monoxide and hydrogen gas.

13. An apparatus for gasifying large molecular weight organic materials comprising:

5 a gasification reactor for gasifying the organic materials into carbon monoxide and hydrogen gas;

a means for supplying the organic materials into the reactor;

a means for supplying oxygen into the reactor;

a means for discharging the carbon monoxide and hydrogen gas from the reactor; and

10 a means for recycling a part of the carbon monoxide and hydrogen gas discharged from the reactor into the reactor.

14. The gasification reactor according to claim 13, wherein the reactor has two parts of the same shape and size which are connected each other vertically.

15

15. The gasification reactor according to claim 13, wherein the means for supplying oxygen has at least two nozzles arranged on the wall of the reactor at a tangential direction

20

16. The gasification reactor according to claim 13, wherein the means for recycling a part of the carbon monoxide and hydrogen gas has at least two nozzles arranged on the wall of the reactor at a tangential direction.